

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions and listings of claims in the application:

1-57. (Canceled).

58. (New) A method for increasing the production of cobalamins, cobamides, cobalamin precursors, or cobamide precursors, wherein said method comprises:

a) introducing a plasmid comprising a DNA sequence selected from the group consisting of the cobA, cobB, cobC, cobD, cobE, cobF, cobG, cobH, cobI, cobJ, cobK, cobL, cobM, cobN, cobO, cobP, cobQ, cobS, cobT, cobU, cobV, cobW, and cobX genes of *P. denitrificans* and homologs of said genes resulting from the degeneracy of the genetic code into a microorganism capable of producing cobalamins or cobamides;

b) culturing said microorganism under conditions suitable for the synthesis of cobalamins, cobamides, cobalamin precursors, or cobamide precursors, wherein said culture conditions are also suitable for expression of said DNA; and

c) recovering the cobalamins, cobamides, cobalamin precursors, or cobamide precursors produced.

59. (New) The method of claim 58, wherein said recovery step comprises:

a) solubilization;

b) conversion to a cyanoform; and

c) purification.

60. (New) The method of claim 58, wherein said cobalamin is coenzyme B<sub>12</sub>.

61. (New) The method of claim 58, wherein said cobalamin precursor or cobamide precursor is selected from the group consisting of decobaltocorrinoids and corrinoids.

62. (New) A method for increasing the production of cobalamins, cobamides, cobalamin precursors, or cobamide precursors, wherein said method comprises:

a) introducing a DNA selected from the group consisting of the cobA, cobB, cobC, cobD, cobE, cobF, cobG, cobH, cobI, cobJ, cobK, cobL, cobM, cobN, cobO, cobP, cobQ, cobS, cobT, cobU, cobV, cobW, and cobX genes of *P. denitrificans* and homologs of said genes resulting from the degeneracy of the genetic code into a microorganism capable of producing cobalamins or cobamides;

b) culturing said microorganism under conditions suitable for the synthesis of cobalamins, cobamides, cobalamin precursors, or cobamide precursors, wherein said culture conditions are also suitable for expression of said DNA; and

c) recovering the cobalamins, cobamides, cobalamin precursors, or cobamide precursors produced.

63. (New) The method of claim 62, wherein said recovery step comprises:

a) solubilization;

b) conversion to a cyanoform; and

c) purification.

64. (New) The method of claim 62, wherein said cobalamin is coenzyme B<sub>12</sub>.

65. (New) The method of claim 62, wherein said cobalamin precursor or cobamide precursor is selected from the group consisting of decobaltocorrinoids and corrinoids.

66. (New) The method of claim 58 or 62 wherein said microorganism is *P. denitrificans* strain SC510 Rif<sup>R</sup>.

67. (New) A method for increasing the industrial production of cobalamins, cobamides, cobalamin precursors, or cobamide precursors, wherein said method comprises:

a) introducing at least one plasmid comprising a DNA sequence selected from the group consisting of cobA, cobB, cobC, cobD, cobE, cobF, cobG, cobH, cobI, cobJ, cobK, cobL, cobM, cobN, cobO, cobP, cobQ, cobS, cobT, cobU, cobV, cobW, and cobX genes of *P. denitrificans* and homologs of said genes resulting from the degeneracy of the genetic code into a microorganism producing cobalamins or cobamides;

b) culturing said microorganism under conditions suitable for the synthesis of cobalamins, cobamides, cobalamin precursors, or cobamide precursors, wherein industrial production comprises culture conditions suitable for expression of said DNA and suitable for production of at least 100 grams of cells; and

c) recovering the cobalamins, cobamides, cobalamin precursors, or cobamide precursors produced,

wherein the industrial production of cobalamins, cobamides, cobalamin precursors, or cobamide precursors by said microorganism is increased by the introduction of said plasmid.

68. (New) The method of claim 67, wherein said host cell is selected from *Pseudomonas denitrificans*, *Rhizobium meliloti*, and *Agrobacterium tumefaciens*.

69. (New) The method of claim 68, wherein said microorganism is *P. denitrificans* strain SC510 Rif<sup>R</sup>.

70. (New) The method of any one of claims 67-69, wherein said cobalamin is coenzyme B<sub>12</sub>.

71. (New) The method of claim 67, wherein said cobalamin precursor or cobamide precursor is selected from the group consisting of decobaltocorrinoids and corrinoids.

72. (New) The method of claim 67, wherein said at least one plasmid comprises the cobF, cobG, cobH, cobI, cobJ, cobK, cobL, and cobM genes of *P. denitrificans* or homologs of said genes resulting from the degeneracy of the genetic code.

73. (New) The method of claim 72, wherein said host cell is selected from *Pseudomonas denitrificans*, *Rhizobium meliloti*, and *Agrobacterium tumefaciens*.

74. (New) The method of claim 73, wherein said microorganism is *P. denitrificans* strain SC510 Rif<sup>R</sup>.

75. (New) The method of any one of claims 72-74, wherein said cobalamin is coenzyme B<sub>12</sub>.

76. (New) The method of claim 72, wherein said cobalamin precursor or cobamide precursor is selected from the group consisting of decobaltocorrinoids and corrinoids.

77. (New) The method of claim 72, wherein said at least one plasmid further comprises the cobA and cobE genes of *P. denitrificans* or homologs of said genes resulting from the degeneracy of the genetic code.

78. (New) The method of claim 77, wherein said host cell is selected from *Pseudomonas denitrificans*, *Rhizobium meliloti*, and *Agrobacterium tumefaciens*.

79. (New) The method of claim 78, wherein said microorganism is *P. denitrificans* strain SC510 Rif<sup>R</sup>.

80. (New) The method of any one of claims 77-79, wherein said cobalamin is coenzyme B<sub>12</sub>.

81. (New) The method of claim 77, wherein said cobalamin precursor or cobamide precursor is selected from the group consisting of decobaltocorrinoids and corrinoids.

82. (New) The method of claim 77, wherein said at least one plasmid further comprises the cobA and cobE genes of *P. denitrificans* or homologs of said genes resulting from the degeneracy of the genetic code.

83. (New) The method of claim 82, wherein said host cell is selected from *Pseudomonas denitrificans*, *Rhizobium meliloti*, and *Agrobacterium tumefaciens*.

84. (New) The method of claim 83, wherein said microorganism is *P. denitrificans* strain SC510 Rif<sup>R</sup>.

85. (New) The method of any one of claims 82-84, wherein said cobalamin is coenzyme B<sub>12</sub>.

86. (New) The method of claim 82, wherein said cobalamin precursor or cobamide precursor is selected from the group consisting of decobaltocorrinoids and corrinoids.

87. (New) A method for increasing the industrial production of cobalamins,

cobamides, cobalamin precursors, or cobamide precursors, wherein said method comprises:

a) introducing at least one plasmid comprising a DNA sequence selected from the group consisting of cobA, cobB, cobC, cobD, cobE, cobF, cobG, cobH, cobI, cobJ, cobK, cobL, cobM, cobN, cobO, cobP, cobQ, cobS, cobT, cobU, cobV, cobW, and cobX genes of *P. denitrificans* and homologs of said genes resulting from the degeneracy of the genetic code into a microorganism capable of producing cobalamins or cobamides;

b) culturing said microorganism under conditions suitable for the synthesis of cobalamins, cobamides, cobalamin precursors, or cobamide precursors, wherein industrial production comprises culture conditions suitable for expression of said DNA and suitable for production of at least 100 grams of cells; and

c) recovering the cobalamins, cobamides, cobalamin precursors, or cobamide precursors produced,

wherein the industrial production of cobalamins, cobamides, cobalamin precursors, or cobamide precursors by said microorganism is increased by the introduction of said plasmid.

88. (New) The method of claim 87, wherein said host cell is selected from *Pseudomonas denitrificans*, *Rhizobium meliloti*, and *Agrobacterium tumefaciens*.

89. (New) The method of claim 88, wherein said microorganism is *P. denitrificans* strain SC510 Rif<sup>R</sup>.

90. (New) The method of any one of claims 87-89, wherein said cobalamin is coenzyme B<sub>12</sub>.

91. (New) The method of claim 87, wherein said cobalamin precursor or cobamide precursor is selected from the group consisting of decobaltocorrinoids and corrinoids.

92. (New) The method of claim 87, wherein said at least one plasmid comprises the cobF, cobG, cobH, cobI, cobJ, cobK, cobL, and cobM genes of *P. denitrificans* or homologs of said genes resulting from the degeneracy of the genetic code.

93. (New) The method of claim 92, wherein said host cell is selected from *Pseudomonas denitrificans*, *Rhizobium meliloti*, and *Agrobacterium tumefaciens*.

94. (New) The method of claim 93, wherein said microorganism is *P. denitrificans* strain SC510 Rif<sup>R</sup>.

95. (New) The method of any one of claims 92-94, wherein said cobalamin is coenzyme B<sub>12</sub>.

96. (New) The method of claim 92, wherein said cobalamin precursor or cobamide precursor is selected from the group consisting of decobaltocorrinoids and corrinoids.



97. (New) The method of claim 92, wherein said at least one plasmid further comprises the cobA and cobE genes of *P. denitrificans* or homologs of said genes resulting from the degeneracy of the genetic code.

98. (New) The method of claim 97, wherein said host cell is selected from *Pseudomonas denitrificans*, *Rhizobium meliloti*, and *Agrobacterium tumefaciens*.

99. (New) The method of claim 98, wherein said microorganism is *P. denitrificans* strain SC510 Rif<sup>R</sup>.

100. (New) The method of any one of claims 97-99, wherein said cobalamin is coenzyme B<sub>12</sub>.

101. (New) The method of claim 97, wherein said cobalamin precursor or cobamide precursor is selected from the group consisting of decobaltocorrinoids and corrinoids.

102. (New) The method of claim 87, wherein said at least one plasmid further comprises the cobA and cobE genes of *P. denitrificans* or homologs of said genes resulting from the degeneracy of the genetic code.

103. (New) The method of claim 102, wherein said host cell is selected from

*Pseudomonas denitrificans*, *Rhizobium meliloti*, and *Agrobacterium tumefaciens*.

104. (New) The method of claim 103, wherein said microorganism is *P. denitrificans* strain SC510 Rif<sup>R</sup>.

105. (New) The method of any one of claims 102-104, wherein said cobalamin is coenzyme B<sub>12</sub>.

106. (New) The method of claim 102, wherein said cobalamin precursor or cobamide precursor is selected from the group consisting of decobaltocorrinoids and corrinoids.

107. (New) The method of any one of claims 67-69, 71-74, 76-79, 81-84, 87-89, 91-94, 96-99, 101-104, and 106, wherein said recovery step comprises:

- a) solubilization;
- b) conversion to a cyanoform; and
- c) purification.

108. (New) The method of claim 70, wherein said recovery step comprises:

- a) solubilization;
- b) conversion to a cyanoform; and
- c) purification.

109. (New) The method of claim 75, wherein said recovery step comprises:

- a) solubilization;
- b) conversion to a cyanoform; and
- c) purification.

110. (New) The method of claim 80, wherein said recovery step comprises:

- a) solubilization;
- b) conversion to a cyanoform; and
- c) purification.

111. (New) The method of claim 85, wherein said recovery step comprises:

- a) solubilization;
- b) conversion to a cyanoform; and
- c) purification.

112. (New) The method of claim 90, wherein said recovery step comprises:

- a) solubilization;
- b) conversion to a cyanoform; and
- c) purification.

113. (New) The method of claim 95, wherein said recovery step comprises:

- a) solubilization;
- b) conversion to a cyanoform; and

c) purification.

114. (New) The method of claim 100, wherein said recovery step comprises:

- a) solubilization;
- b) conversion to a cyanoform; and
- c) purification.

115. (New) The method of claim 105, wherein said recovery step comprises:

- a) solubilization;
- b) conversion to a cyanoform; and
- c) purification.